

Application No.: 09/753913

Docket No.: 34650-00448USPT  
Customer No. 23932AMENDMENTS TO THE CLAIMS

1. (original) A method for correlating a received sequence to known sequences in a communications system, comprising the steps of:

providing a plurality of known sequences of values;

receiving a sequence of values;

producing at least one reusable addend;

applying said sequence of values to each known sequence of values of said plurality of known sequences of values to produce respective sets of addends, each set of addends of said respective sets of addends corresponding to a respective known sequence of values of said plurality of known sequences of values and including said at least one reusable addend;

determining respective correlation results responsive to said respective sets of addends, each respective correlation result corresponding to a correlation between said sequence of values and a respective known sequence of values of said plurality of known sequences of values; and

wherein said each set of addends of said respective sets of addends have been reduced in number utilizing a common subexpression elimination algorithm.

2. (original) The method of Claim 1, wherein said each known sequence of values of said plurality of known sequences of values includes a plurality of +1 values and a plurality of -1 values.

3. (original) The method of Claim 1, wherein said step of producing at least one reusable addend comprises the step of producing said at least one reusable addend responsive to said sequence of values.

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4. (original) The method of Claim 1, wherein said each known sequence of values of said plurality of known sequences of values comprises a training sequence.

5. (original) The method of Claim 1, wherein said communications system comprises a wireless communications system operating substantially in accordance with the Global System for Mobile Communications (GSM) standard.

6. (original) The method of Claim 1, wherein said step of applying said sequence of values to each known sequence of values of said plurality of known sequences of values to produce respective sets of addends comprises the step of applying said sequence of values to said each known sequence of values of said plurality of known sequences of values in a plurality of manipulated correlation equations.

7. (original) The method of Claim 1, further comprising the steps of:  
determining whether said each respective correlation result meets a predetermined criterion; and  
if so, initiating at least one algorithm for detecting and rejecting a signal associated with said each respective correlation result.

8. (original) The method of Claim 1, wherein said step of applying said sequence of values to each known sequence of values of said plurality of known sequences of values to produce respective sets of addends comprises the step of applying said sequence of values at a plurality of offsets to said each known sequence of values of said plurality of known sequences of values.

9. (original) A method for correlating a received sequence to a known sequence in a communications system, comprising the steps of:  
receiving a sequence of values;

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applying said sequence of values to at least one known sequence of values in a correlation equation, said correlation equation definable as including a sum of products of said sequence of values and said at least one known sequence of values;

determining a correlation result of said correlation equation using a sum that is independent of said at least one known sequence of values; and

wherein said correlation equation has been manipulated to produce said sum that is independent of said at least one known sequence of values.

10. (original) The method of Claim 9, wherein said sum that is independent of said at least one known sequence of values is dependent on said sequence of values and offsets thereof.

11. (original) The method of Claim 9, further comprising the step of updating said sum that is independent of said at least one known sequence of values when an offset is being incremented or decremented using no more than two values of said sequence of values.

12. (original) A method for correlating a received sequence to a known sequence in a communications system, comprising the steps of:

receiving a sequence of values;

applying said sequence of values to at least one known sequence of values in a correlation equation, said correlation equation definable as including a sum of products of said sequence of values and said at least one known sequence of values, said at least one known sequence of values including a known number of values and at least two identical subsequences of values;

determining a correlation result of said correlation equation using a sum of products whose number of product addends is less than said known number of said known number of values; and

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wherein said correlation equation has been manipulated such that said number of product addends of said sum of products is less than said known number of said known number of values by eliminating products of one of said at least two identical subsequences of values.

13. (original) The method of Claim 12, wherein said number of product addends of said sum of products is less than said known number of said known number of values by a number equal to a length of each of said at least two identical subsequences of values.

14. (original) The method of Claim 12, wherein at least one product addend of said number of product addends comprises a multiplication by 1 that requires no mathematical operation.

15. (original) A method for correlating a received sequence to known sequences in a communications system, comprising the steps of:

providing a first known sequence of values;

providing a second known sequence of values;

receiving a sequence of values;

producing a common addend responsive to said sequence of values;

applying said sequence of values to said first known sequence of values at a plurality of offsets to produce a first set of addends, said first set of addends including said common addend;

applying said sequence of values to said second known sequence of values at said plurality of offsets to produce a second set of addends, said second set of addends including said common addend;

calculating a first correlate based, at least in part, on said first set of addends;

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calculating a second correlate based, at least in part, on said second set of addends; and

wherein said first set of addends and said second set of addends are determined, at least partially, by a common subexpression elimination analysis.

16. (original) The method of Claim 15, wherein said step of producing a common addend responsive to said sequence of values further comprises the step of adjusting said common addend responsive to an offset value of said plurality of offsets.

17. (original) The method of Claim 16, wherein said step of adjusting said common addend responsive to an offset value of said plurality of offsets further comprises the step of adjusting said common addend by performing only two add or subtract operations when incrementing from a first offset of said plurality of offsets to a second offset of said plurality of offsets.

18. (original) The method of Claim 15, wherein said common addend is independent of both said first known sequence of values and said second known sequence of values.

19. (original) The method of Claim 15, wherein said step of calculating a first correlate based, at least in part, on said first set of addends comprises the step of calculating a negative of said first correlate if a number of non-zero first-order terms involved in said step of calculating a first correlate based, at least in part, on said first set of addends meets a predetermined criterion.

20. (original) The method of Claim 15, further comprising the steps of:  
creating a plurality of second order terms by combining a respective plurality of at least two values of said sequence of values;

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adjusting less than all second order terms of said plurality of second order terms when incrementing from a first offset of said plurality of offsets to a second offset of said plurality of offsets; and

wherein said step of calculating a first correlate based, at least in part, on said first set of addends comprises the step of calculating said first correlate based, at least in part, on said plurality of second order terms.

21. (original) A method for correlating a received sequence to a known sequence in a communications system, comprising the steps of:

receiving a sequence of values;

applying said sequence of values to at least one known sequence of values in a correlation equation, said correlation equation definable as including a sum of products of said sequence of values and said at least one known sequence of values; and

determining a correlation result of a manipulated version of said correlation equation, said manipulated version of said correlation equation derived from performing at least two of the following modifications:

said correlation equation modified so that at least one product of said sum of products of said correlation equation becomes zero;

said correlation equation modified to produce a sum that is independent of said at least one known sequence of values;

said correlation equation, wherein said at least one known sequence of values includes a known number of values and at least two identical subsequences of values, modified such that a number of product addends of said sum of products of said correlation equation is less than said known number of said known number of values of said at least one known sequence of values by

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eliminating products corresponding to one of said at least two identical subsequences of values of said at least one known sequence of values;

    said correlation equation and terms thereof modified so as to eliminate common subexpressions; and

    said correlation equation modified such that a negative result of said correlation equation is to be calculated.

22. (original) The method of Claim 21, further comprising the steps of:  
    determining whether said correlation result meets a predetermined criterion; and

    if so, initiating at least one algorithm for detecting and rejecting a signal that corresponds to said correlation result that meets said predetermined criterion.

23. (original) The method of Claim 21, wherein said communications system comprises a wireless communications system operating substantially in accordance with the Global System for Mobile Communications (GSM) standard.

24. (original) The method of Claim 21, wherein:

    said step of applying said sequence of values to at least one known sequence of values in a correlation equation comprises the step of applying said sequence of values at a plurality of offsets to said at least one known sequence of values in said correlation equation.

25. (original) A communication station for correlating a received sequence to a known sequence in a communications system, the communication station comprising:

    a receiver, said receiver adapted to receive a sequence of values;

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a processing unit operatively connected to said receiver, said processing unit adapted to apply said sequence of values to at least one known sequence of values in a correlation equation, said correlation equation definable as including a sum of products of said sequence of values and said at least one known sequence of values;

said processing unit operable to determine a correlation result of a manipulated version of said correlation equation, said manipulated version of said correlation equation derived as a result of performing at least two of the following modifications:

modify said correlation equation so that at least one product of said sum of products of said correlation equation becomes zero;

modify said correlation equation to produce a sum that is independent of said at least one known sequence of values;

modify said correlation equation, wherein said at least one known sequence of values includes a known number of values and at least two identical subsequences of values, such that a number of product addends of said sum of products is less than said known number of said known number of values by eliminating products corresponding to one of said at least two identical subsequences of values;

modify said correlation equation and terms thereof so as to eliminate common subexpressions; and

modify said correlation equation such that a negative result of said correlation equation is to be calculated.

26. (original) The communication station of Claim 25, wherein said processing unit is further operable to determine whether said correlation result meets a predetermined criterion; and

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wherein the communication station further comprises means for initiating at least one algorithm for detecting and rejecting a signal that corresponds to said correlation result that meets said predetermined criterion.

27. (original) The communication station of Claim 25, wherein said communications system comprises a wireless communications system operating substantially in accordance with the Global System for Mobile Communications (GSM) standard.

28. (original) The communication station of Claim 25, further comprising a memory unit operatively connected to said processing unit, said memory unit storing a plurality of known sequences of values.

29. (original) The communication station of Claim 25, wherein the communication station comprises a mobile terminal or a base station.

30. (currently amended) A communication station for correlating a received sequence to a known sequence in a communications system, the communication station comprising:

a receiver, said receiver adapted to receive a sequence of values;

a memory, said memory storing a plurality of known sequences of values;

a processing unit operatively connected to said receiver and said memory, said processing unit programmed to compute a plurality of correlation results between said sequence of values and said plurality of known sequences of values; and

wherein said processing unit is configured to compute said plurality of correlation results using a modified correlation equation; and

~~wherein the communication station comprises at least one of a base station and a mobile terminal.~~

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wherein said modified correlation equation comprises a correlation equation that has been modified, said correlation equation definable as including a sum of products of said sequence of values and a known sequence of values from said plurality of known sequences of values, the modification resulting from performing at least two of the following operations:

modify said correlation equation so that at least one product of said sum of products of said correlation equation becomes zero;

modify said correlation equation to produce a sum that is independent of said known sequence of values;

modify said correlation equation, wherein said known sequence of values includes a known number of values and at least two identical subsequences of values, such that a number of product addends of said sum of products is less than said known number of said known number of values by eliminating products corresponding to one of said at least two identical subsequences of values;

modify said correlation equation and terms thereof so as to eliminate common subexpressions; and

modify said correlation equation such that a negative result of said correlation equation is to be calculated.

31. (canceled)

32. (currently amended) The communication station of Claim 34 30, wherein said operations are completed prior to receiving said sequence of values and during a design or initialization phase of the communication station.

33. (canceled)

34. (original) The communication station of Claim 30, wherein said processing unit is further programmed to initiate at least one algorithm for

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detecting and rejecting any signal corresponding to a correlation result of said plurality of correlation results that is greater than a predetermined threshold.

35. (new) The communication station of claim 30, wherein the communication station comprises at least one of a base station and a mobile terminal.